

This latter tooth (Fig. 3, Pl. I.; figs. 2 and 3, Pl. IV.) was found by itself, embedded in the banks of the Rio Tercero, or Carcarana, near the Parana, at the distance of a hundred and eighty miles from the locality where the head was discovered. Fragments of a molar tooth of a *Toxodon*, apparently the seventh of the left side, upper jaw, were also found at Bajada de St^e Fé, in the province of Entre Rios, distant forty miles from the mouth of the Rio Tercero.

All the molar teeth are long and curved, and without fangs,* as in most of the herbivorous species of the Rodent Order: in those, however, with curved grinders, as the *Aperca* or Guinea-pig, and *Cavia Patagonica*, the concavity of the upper grinders is directed outward, the fangs of the teeth of the opposite sides diverging as they ascend in the sockets; but, in the *Toxodon*, the convexity of the grinders is outward, and the fangs converge and almost meet at the middle line of the palate, forming a series of arches, capable of overcoming immense resistance from pressure. (See the upper view of the skull, Plate III., in which the fractures expose to view a part of the series of these arched sockets.)

Of the incisors, the two small ones (the sockets of which are indicated at *s s*, Pl. III.) are situated in the middle of the front of the upper jaw, close to the suture between the intermaxillaries, and the two large ones in immediate contiguity with the small incisors, which they greatly exceed in size. The sockets of the two large incisors (*t t*, Pl. III.) extend backwards, in an arched form, preserving a uniform diameter, as far as the commencement of the alveoli of the molar teeth: the curve which they describe is the segment of a circle; the position, form, and extent of the sockets of these incisors are the same as in those of the corresponding teeth of the Rodentia.

The matrix, or secreting pulp of the large incisors, was lodged, as in the Rodentia, in close proximity with the sockets of the anterior molars; and we are enabled to infer, from the form of the incisive sockets, notwithstanding the absence of the teeth themselves, that the pulp was persistent, and that the growth of these incisors, like those of the Rodentia, continued throughout life.

This condition, joined with the form and curvature of the socket, implies a continual wearing away of the crown of the tooth by attrition against opposing incisors of a corresponding structure in the lower jaw: and as a corollary, it may be inferred that the teeth in question had a partial coating of enamel, to produce a cutting edge, and were, in fact, true *dentes scalprarii*. The number of incisors in the upper jaw of *Toxodon*, is not without its parallel in the Rodent Order, the genus *Lepus* being characterized by four, instead of two superior incisors, which also present a similar relative size but have a different relative position, the

* True fangs exist only in teeth of temporary growth, they may be one or more in number, but always diminish in size as they recede from the crown of the tooth, and are either solid, or with a very small canal.

small incisors, in the hare and rabbit, being so placed immediately behind the large pair, as to receive the appulse of the single pair of incisors in the lower jaw.

In the *Toxodon* the position of the incisors, in the same transverse line, might lead to the inference, that they were opposed by a corresponding number in the lower jaw; but the numerous examples of inequality, in the number of incisors, in the upper and lower jaws of existing mammalia, forbid any conclusion on this point.* The sockets of the small mesial incisors of the *Toxodon* (*s s*, Pl. III.) gradually diminish in size, as they penetrate the intermaxillary bones, and we may, therefore, infer that the pulp was gradually absorbed in the progress of their development; and that, like ordinary incisors, their growth was of limited duration, and their lodgment in the jaw effected by a single conical fang.

I may observe, that the formation of a fang is the necessary consequence of the gradual absorption of the matrix or pulp of a tooth; for the pulp continues, as it diminishes in size, to deposit ivory upon the inner surface of the cavity of the tooth from which it is receding, and the tooth or fang thus likewise progressively diminishes in size. The formation of the socket proceeds uninterruptedly, and the bone encroaching upon the space left by the tooth, closely surrounds the wasting fang, and affords it a firm support; and thus an inference may be drawn from the form of the socket alone, as to whether the tooth it contained had or had not one or more conical fangs, and consequently whether its growth was temporary or uninterrupted.

Applying this reasoning to the molar teeth of the *Toxodon*, we infer that their growth, like those of most of the Phyllophagous Rodents, of the *Megatherium* and *Armadillo*, was perpetual, because their sockets are continued of uniform size from the open to the closed extremity; and the molar tooth which is preserved proves the accuracy of the deduction, inasmuch as its base is excavated by a large conical cavity for the lodgment of the pulp, the continued activity of which was the compensation here designed to meet the effects of attrition on the opposite or grinding surface of the tooth.

The molar tooth discovered by Mr. Darwin in the banks of the Tercero, not only belonged to the same species as the skull under consideration, but to an individual of the same size; it fits exactly into the socket next to the posterior one of the right side. The figures subjoined of this molar tooth (Fig. 3, Pl. I.; figs. 2 and 3, Pl. IV.) almost preclude the necessity of a description. The transverse section of the tooth gives an irregular, unequal sided, prism; the two broadest sides of which converge to the anterior angle, which is obtusely rounded. The

* This was written before an examination of the fragment of a lower jaw, forming part of Mr. Darwin's collection of Fossil Remains, had led me to suspect that it was referrible to the genus *Toxodon*; should this suspicion prove correct, the four unequal incisors of the upper jaw are opposed to six equal sized ones in the lower.